

UNITED STATES OCCUPATIONAL DIFFERENCE BETWEEN SEXES BY SIZE OF PLACE

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BACKGROUND

Sex differentials in occupational composition have been studied in the past (Knudsen 1969; Gross 1969). The technique has primarily dealt only with the percentage of males and females in specific occupational categories. A recent study of sex differentiation by occupational categories of census data for white females in 66 *standard metropolitan statistical areas* (SMSAs) in the United States found rather wide differences (Martin, Poston 1972). If SMSAs vary widely in sex differentiation of occupational composition, how wide is the variation along the rural-urban dimension? What are the effects, going from central city through various sizes of urban areas, to the rural-farm areas of the United States in the study of occupational differentiation? Drawing on the work of Durkheim (1974) one would expect more densely settled places to be characterized by greater occupational differentiation regardless of sex, with a larger spread of men and women throughout various occupational categories. Between-sex differences would also be expected to vary by size of place. A lower degree of sex differentiation in occupational composition should be found in larger places, due partially to the opportunity for females to move into previously male-dominated occupations. Lacking this occupational opportunity structure, females in smaller places, or in rural areas would still be employed more extensively in sex-typed occupations. Smaller places and rural areas exhibit greater sex differentiation in occupational composition.

PROCEDURE

Definitions of rural and urban, and the size of place categories used here are those of the U.S. Census of 1970 (Census Bureau 1973). *Rural* is dichotomized into *rural farm* and *rural nonfarm*. The urban category consists of central cities, urban fringe, other places of 10,000 or more, and other places of 2500 to 10,000. Central cities and urban fringe areas are combined to form the census category of *urbanized areas*. Central cities are those which contain 50,000 or more inhabitants. The urban fringe area pertains to "that part of the

urbanized area outside of the city." (Spiegelman 1970 296)

The boundaries used to define urbanized areas are generally nonpolitical. Nonpolitical subdivisions are used in this analysis because interest centers on the impact of size on sex differentiation in occupational composition. A political unit of analysis, such as a county was unacceptable, first because some of the urbanized areas may encompass more than one county, and second because there may not be enough variation along the rural-urban dimension or along the size of place continuum by county to make this type of analysis meaningful.

Occupational differentiation is examined on the basis of the 12 occupational categories as listed in Table 1, from U.S. Census definitions. In some of these categories there are differences respecting specific occupations for males and females. For purposes of this analysis occupational differentiation by sex refers to the degree of dissimilarity in occupational composition of two categories of persons distinguished by sex. I will use the Duncan (1955) index of dissimilarity, which has already been applied by several researchers (Duncan, Duncan 1959; Gibbs 1965; Martin, Poston 1972).

This analysis follows the Gibbs approach, dividing the index of dissimilarity into two measures: the crude measure of differentiation, (CMD) and the standardized measure of differentiation (SMD). The SMD eliminates the differences in occupational composition contingent on differences in the relative number of persons employed in the 12 categories. The CMD reflects the minimum percent of females who would have to change their categorical occupation for it to be identical to that of males. For computation:

$$CMD = .5 [\sum | X_b - Y_b |]$$

where X_b refers to the percent of employed males, and Y_b refers to the percent of females employed in each occupational category (Gibbs 1965). Since the CMD may reflect differences in the relative sizes of the occupational categories, I use the SMD to remove effects of size on differentiation.

This standardization is necessary in light of the fact that the occupational structure may be such that few persons, either male or female, are employed in a particular category. Thus, differentiation would be reduced to a function of the occupational structure. Conversely, if a category in which sex differentiation is relatively great happens to be relatively larger than other categories, sex differentiation would be inflated in that category, and would contribute to inflation of the total differentiation.

Using the SMD, one may investigate the influence of occupational structure on occupational differentiation by removing differences among the occupational categories with respect to size. To eliminate these differences, 1000 persons are assigned to each occupational category while maintaining the same male-female ratio in each category as is shown in the census data.

Several computational procedures intervene between CMD and the SMD, the crude and standardized measures of differentiation. One must compute X_c for the number of males, and Y_c for the number of females in each occupational category assuming that the category contains 1000 persons distributed by sex in the actual proportion for the occupational category. X_a and Y_a represents the actual number of males and females in each occupational category. Z_a refers to the total in the occupational category, and is thus equal to: $X_a + Y_a$. The formulas are:

- 1: $X_c = 1000 (X_a / Z_a)$
- 2: $Y_c = 1000 (Y_a / Z_a)$
- 3: $X_d = 100 (X_c / \Sigma X_c)$
- 4: $Y_d = 100 (Y_c / \Sigma Y_c)$
- 5: $SMD = .5 (\Sigma |X_d - Y_d|)$

X_d and Y_d are computed from X_c and Y_c using formulas 3) and 4), to convert them to percentages of the respective column totals shown in Table 1. X_d and Y_d differ from X_b and Y_b in that the "d" subscript values are not affected by variation in size of occupation categories. The *standardized measure of differentiation*, SMD, as computed by formula 5) serves to evaluate the *crude measure of differentiation*, CMD. If SMD is greater than CMD, the occupational structure reduces sex differentiation in occupational composition. Conversely, if the ratio, SMD / CMD is less

than 1.0, the occupational structure increases sex differentiation. If SMD = CMD, sex differentiation is not affected by occupational structure (Gibbs 1965).

RESULTS

The data in Table 1 show that for the total United States, 41.7 percent of the employed females would have to change occupational categories in order to equalize occupational distribution. The amount of redistribution necessary is highest in the clerical workers category and lowest in the operatives category. In central cities, 36 percent of employed females would have to change occupations to equalize dissimilarities in occupational composition. Again the greatest redistribution would occur in the clerical workers category. The category requiring the least redistribution is that of professional and technical workers.

For the urban fringe areas to equalize their differentiation of occupational composition, 41 percent of all employed females would have to shift occupations, and clerical workers would make the largest redistribution. No compositional changes would have to occur in the sales workers category, where there is no difference in proportions employed by sex.

In places of 10,000 or more population, 40.1 percent of the employed females must change occupational categories to match the male occupational distribution. As in the total United States, the largest redistribution would occur in the clerical workers category, while the smallest redistribution would be in the operatives category. The same pattern holds for places of 2500 to 10,000 population. In this stratum, 43.3 percent of female workers would have to change occupations to be distributed equally with males.

Rural nonfarm areas, to equal occupational composition based on sex would have to redistribute 46.7 percent of the female workers. Least redistribution would be required in the sales workers category, and the greatest redistribution would be required in the category of craftsmen and foremen. Rural farm areas show the greatest amount of sex differentiation in occupational makeup, where 59.7 percent of employed females would have to change occupational categories to achieve equal distribution with the males.

TABLE 1: MEASURES OF SEX DIFFERENTIATION BY SIZE OF PLACE & OCCUPATION
(Crude measure of differentiation, CMD, regular type; Standardized measure, SMD, bold type.)

| Category of workers | Central Cities | Urban Fringe | 10,000 or more | 2500-10,000 | Rural Nonfarm | Rural Farm | Total U.S. |
|--------------------------------|----------------|--------------|----------------|-------------|---------------|-------------|-------------|
| Professional, technical | 0.1 | 1.3 | 1.3 | 2.8 | 3.2 | 10.3 | 1.4 |
| | 1.9 | 0.7 | 2.8 | 3.3 | 2.7 | 7.3 | 2.6 |
| Manager, administrator | 7.1 | 9.8 | 8.6 | 8.6 | 6.3 | 1.7 | 7.6 |
| | 6.4 | 7.4 | 6.5 | 6.8 | 6.4 | 6.3 | 6.2 |
| Sales workers | 0.9 | 0.0 | 0.7 | 1.3 | 1.5 | 3.2 | 0.5 |
| | 0.7 | 1.4 | 2.8 | 3.3 | 2.5 | 3.5 | 2.3 |
| Clerical & kindred workers | 27.0 | 32.3 | 23.6 | 21.8 | 21.8 | 20.9 | 27.3 |
| | 12.8 | 15.4 | 14.9 | 14.4 | 14.9 | 13.9 | 15.1 |
| Craftsmen, foremen | 17.9 | 19.9 | 18.7 | 20.5 | 23.2 | 11.8 | 19.4 |
| | 11.2 | 10.8 | 10.7 | 10.8 | 10.9 | 11.4 | 10.7 |
| Operatives, except transport | 1.6 | 0.9 | 0.3 | 0.6 | 3.0 | 7.9 | 0.2 |
| | 0.7 | 0.6 | 2.0 | 1.9 | 1.6 | 1.2 | 1.9 |
| Transport equipment operatives | 1.9 | 4.5 | 5.4 | 5.8 | 6.3 | 3.6 | 5.4 |
| | 2.4 | 10.6 | 11.3 | 11.3 | 10.5 | 10.5 | 10.8 |
| Laborers except farm | 6.2 | 4.4 | 6.0 | 6.4 | 6.7 | 3.6 | 5.6 |
| | 10.4 | 9.6 | 9.5 | 9.7 | 9.4 | 9.9 | 9.3 |
| Farmers & farm managers | 0.2 | 0.1 | 0.4 | 0.8 | 1.6 | 34.6 | 2.5 |
| | 6.8 | 7.2 | 10.4 | 10.8 | 10.8 | 11.8 | 10.7 |
| Farm laborers, farm foremen | 0.2 | 0.1 | 0.7 | 1.3 | 2.6 | 4.4 | 1.2 |
| | 5.3 | 3.5 | 6.0 | 6.4 | 7.8 | 7.3 | 6.4 |
| Service workers, non-domestic | 5.0 | 6.6 | 10.1 | 11.8 | 12.5 | 13.3 | 8.5 |
| | 5.2 | 7.4 | 8.8 | 10.0 | 10.4 | 10.2 | 8.4 |
| Private household workers | 3.9 | 2.1 | 4.4 | 5.1 | 4.7 | 4.1 | 3.8 |
| | 21.2 | 23.6 | 23.1 | 22.9 | 23.7 | 21.1 | 23.8 |
| CMD | 36.0 | 41.0 | 40.1 | 43.4 | 46.7 | 59.7 | 41.7 |
| SMD | 42.5 | 49.1 | 54.4 | 55.8 | 55.8 | 57.2 | 54.1 |
| SMD / CMD | 1.2 | 1.2 | 1.4 | 1.3 | 1.2 | 0.9 | 1.3 |

The sex imbalance is greatest in the farmers and farm managers category, and lowest in the managers and administrators category. We have seen that the CMD is affected by the relative sizes of the occupational categories. Without being able to eliminate the effects of the size of occupational categories on sex differences in occupational composition, the size of place categories are ranked from high to low according to occupational differentiation by sex in the following order: 1) rural farm; 2) rural nonfarm; 3) places of 2500 to 10,000; 4) urban fringe; 5) places of 10,000 or more; 6) central cities.

As reflected in the bold type in Table 1, when occupational differentiation is standardized, 54.1 percent of the employed females in the United States must change occupation categories to equal the male occupational distribution. The greatest change would occur in the private household workers category, and the least change would be required in the

clerical workers category. Regardless of size of place or rural-urban residence, the same categorical pattern emerges.

SMD values are the same for rural nonfarm and places 2500 to 10,000 in population. In places of 10,000 plus population, 54.4 percent of women would have to shift to equalize occupation distribution. Central cities would require the least redistribution, but it is still very substantial.

When the relative size of occupational categories is standardized, places in the United States may be ranked from high to low in occupational differentiation by sex as follows: 1) rural farm; 2.5) rural nonfarm and places of 2500-10,000; 4) places of 10,000 plus; 5) urban fringe; 6) central cities.

Sex differentiation in female occupational composition increases as size of place decreases. I have suggested that different size places may be characterized by differences in female occupational opportunity structure.

No direct measure of this opportunity structure was available for analysis, but the ratio of the SMD to the CMD (Table 1; last line) gives an indication of the impact of the occupational structure on sex differentials in occupational composition.

For the total United States, the ratio, $SMD / CMD = 1.30$. Since the SMD value is greater, the occupational structure is such that overall, it reduces occupational differentiation. Places of 10,000 plus population display the highest ratio. Here, the occupational structure has its largest effect in reducing overall differentiation. The ratio of SMD to CMD has its next highest value in places with population 2500-10,000. The urban fringe, rural nonfarm areas and central cities also have similar SMD:CMD ratios. Only in the rural farm area is the occupational structure such that it increases sex differentiation in occupational composition.

DISCUSSION

The SMD and CMD values indicate an inverse relation between size of place and sex differentiation in occupational composition. The sex-based division of labor increases as size of place decreases. The occupational structure is a major factor in this pattern. There also appears to be a pattern of effects of occupational structure on differentiation by size of place category.

The index values are relative to the occupational categories chosen for analysis. A different set of occupational categories could have produced different results. Because of the great breadth of some of the categories, is it likely that the true amount of sex differentiation in occupational composition is underestimated in some categories.

The small degree of differentiation found in the professional and technical workers category may mask major sex differentiation

within the category. Males dominate such professions as lawyer, engineer and physician, while female may dominate professions of teacher and nurse. Sex differentiation would increase if analyzed by subcategory.

Another factor which may have affected this analysis is that the occupational data are given by size of place of residence. Difference between place of residence and place of work has not been considered. Some of the differentiation in the central cities may be shown for smaller size places simply because many employed persons reside outside the city and commute to work.

Finally, data were not included on the age and race of the various occupational categories by size of place. Since these two variables enter into the pattern of division of labor or occupational differentiation, they would clearly affect the outcome of analysis.

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